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MAGAZINE FOR PROFESSIONALS IN DENTISTRY

SPECIAL LAB-SIDE EDITION

OUTSTANDING AESTHETICS AT THE FIRST GO

CERABIEN™ MiLai is a set of porcelains and internal stains specifically designed for the micro-layering technique. The name “MiLai” is derived from the term “micro-layering” and the Japanese word “mirai” (which means future). The innovative product based on synthetic feldspar enables dental technicians to add the final touch to their zirconia or lithium disilicate restorations in a simple and time-saving procedure – for outstanding aesthetics right from the start.

OUTSTANDING AESTHETICS AT THE FIRST GO

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INTRODUCING CERABIEN™ MiLai, LOW-FUSING PORCELAINS AND INTERNAL STAINS

MICRO-LAYERING: A NEW ERA IN PORCELAIN LAYERING

Highly aesthetic lithium disilicate or zirconia-based framework materials combined with a micro-layer of porcelain are becoming the new standard for producing lifelike all-ceramic restorations. For those wondering why it is worth adopting the new technique, how to start, how to improve and which materials to use, we had a conversation with a true expert in all things ceramic: Mathias Fernandez Y Lombardi, Head of Technical Marketing at Kuraray Europe GmbH.

Mathias Fernandez Y Lombardi, do you believe in micro-layering as a technique that is capable of streamlining procedures in the dental laboratory while fulfilling high aesthetic demands?

Yes, I truly believe that **micro-layering is the next step in the evolution of indirect restorative techniques and materials.** This evolution is driven by improvements in the area of framework materials, which are becoming more and more tooth-like in their appearance. We have moved from metal to opaque, high-strength zirconia and - more recently - high-translucency multi-layered zirconia and lithium disilicate, which no longer require thick porcelain layers to achieve lifelike outcomes. In this context, it is only natural that a new technique has emerged.

Kuraray Noritake Dental Inc. is well-known as a pioneer in multi-layered zirconia technology and veneering porcelains. Are there any products particularly suitable or specifically developed for micro-layering?

We offer a series of high-translucency, multi-layered zirconia perfectly suited for micro-layering on the one hand and an aligned portfolio of internal stains and porcelains specifically developed for micro-layering on the other. The zirconia portfolio includes three different blank types with a multi-layered colour structure (KATANA™ Zirconia UTML, STML and HTML PLUS), one variant with flexural strength, translucency and colour gradation (KATANA™ Zirconia YML), but also the timeless classic HT for the frameworks should be mentioned. While the first three offer a uniform strength and are chosen based on the indication, KATANA™ Zirconia YML with its multi-layered strength is a universal material suitable for an extremely wide range of applications.

Figure 1
CERABIEN™ MiLai Porcelains.

Figure 2
CERABIEN™ MiLai Internal Stains.

The set of internal stains and porcelains specifically designed for the micro-layering technique that we just introduced is CERABIEN™ MiLai. With this addition to the CERABIEN™ family, we offer a perfect complement to the KATANA™ Zirconia Multi-Layered series, and with it, a revolutionary workflow that significantly deviates from traditional methods, enabling us to deliver greater efficiency, cost savings, and more flexibility. However, CERABIEN™ MiLai is not only compatible with KATANA™ Zirconia, but also with aesthetic zirconia from other manufacturers and reinforced silicate ceramics such as lithium disilicate with a CTE value within 9.5~11.0×10-^{6}/K (50 °C~500 °C).

Why should a dental technician start using the micro-layering technique and invest in a new set of porcelains for this purpose?

The reasons to start micro-layering are obvious: depending on the design, micro-layering can eliminate or minimize the chipping risk. Moreover, the technique is highly efficient, as the number of layers and bakes is drastically reduced. This results in a reduced thickness of the restoration facilitating minimally invasive preparations and a less complex layering procedure that even beginners are able to learn and implement very quickly. A new set of porcelains specifically developed for micro-layering like CERABIEN™ MiLai can further support the feasibility of the technique and the quality of the outcomes achieved even by beginners. Due to the shortage of skilled workers in dental laboratories, this aspect is becoming increasingly important.

How does CERABIEN™ MiLai support users in achieving aesthetic, high-quality outcomes right from the start?

With traditional porcelain systems, it can be challenging to create all the desired individual shade effects in a layer of only 0.03 mm to 0.6 mm thickness. With CERABIEN™ MiLai, this is not the case as the system is specifically designed for this purpose. The saturation and translucency of the porcelains are matched to the framework materials and adjusted to the volume of the porcelain layer. The compact line-up makes it quite easy to select and combine the right shades for satisfying results right from the start. More experienced users can mix the different components for additional effects.

Furthermore, the versatility of CERABIEN™ MiLai is a key feature that results in great outcomes. The system can be used on lithium disilicate and zirconia, a monolithic surface, a vestibular cut-back or a full micro cut-back. With this broad application spectrum, dental technicians are likely to use CERABIEN™ MiLai daily, which allows them to develop a true understanding of the components and to establish work routines very quickly. As a consequence, the outcomes become predictable and controllable. This is further supported by consistent handling and optical properties – all the result of a single core technology.

Please tell us more about this technology.

The core technology used in CERABIEN™ MiLai is synthetic feldspathic ceramic technology. Originally developed for Super Porcelain EX-3 and adjusted to the specific needs of CERABIEN™ ZR in the first step and CERABIEN™ MiLai more recently, this technology is responsible for consistent properties. This is because the formulation never needs to be aligned due to changing natural components. However, I believe that the greatest benefit of using feldspathic porcelain lies in the elimination of shadow effects. Everyone familiar with layering natural feldspathic porcelains on ceramics will know the typical greyish shadows appearing in restorations after several firing cycles. They originate from inhomogeneities in the material caused by micro-movements during firing. Showing no movements in this phase, synthetic felspathic porcelains from Kuraray Noritake Dental Inc. are the first and only porcelains preventing this effect. Finally, the further developed version of the technology allowed us to realize a low firing temperature of just 740 °C while maintaining the desired coefficient of thermal expansion. This is essential for the material's compatibility with lithium disilicate.

Figure 4
Application of CERABIEN™ MiLai Tissue Porcelains on a complex restoration with the teeth already finalized (image courtesy of MDT Ioulianos Moustakis).

‘The compact line-up makes it quite easy to select and combine the right shades for satisfying results right from the start’.

– Mathias Fernandez Y Lombardi –

Are there any other benefits arising from the low firing temperature?

The low firing temperature definitely offers an economic benefit, as the process consumes less energy and takes less time compared to high-temperature firing cycles. Moreover, the wear of the furnace is reduced. Finally, the low temperature is of interest for users of CERABIEN™ ZR in specific indications: Some ceramists like to combine the systems especially in cases with artificial gingiva. They create the porcelain work on the teeth with CERABIEN™ ZR first and then individualize the gingival area with CERABIEN™ MiLai. Due to the low firing temperature, the form, colour and surface of the previously applied veneering porcelain will remain stable.

Do you have any application technique recommendations for CERABIEN™ MiLai?

The best aesthetic outcomes are obtained by using the internal stain technique. By applying the stains first, it is possible to create natural depth effects despite the minimal thickness of the porcelain layer. The stains are easy to use and the outcomes are impressive. The micro-layer of porcelain applied on top acts like a window imitating the enamel, which contributes to a tooth-like appearance. Due to the compact line-up and easily manageable effects, this technique is even suitable for beginners.

Is the procedure different depending on the base material (lithium disilicate versus zirconia)?

Most of the steps are identical. However, surface conditioning may be different depending on the material used (as described in the material manufacturer's instructions for use). Moreover, Value Liner 1 or Value Liner 2 is typically used on lithium disilicate for wash baking, whereas Translucent or Luster are recommended for this step on zirconia. When space is limited, internal stains may be applied directly. All following steps – the optional but highly recommended application of internal stains, the building-up of Translucent or Luster and baking, morphological corrections, the glaze bake and finishing – are identical.

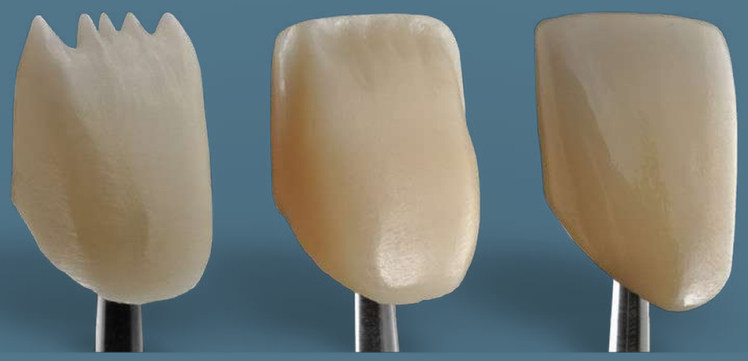


Figure 3
Virtually unlimited design options: crown with a full micro cut-back, crown with a vestibular cut-back and monolithic restoration (images courtesy of MDT Daniele Rondoni).

'The best aesthetic outcomes are obtained by using the internal stain technique'.

– Mathias Fernandez Y Lombardi –

Figure 5
Application of CERABIEN™ MiLai Internal Stains on a zirconia bridge (image courtesy of MDT Ioulianos Moustakis).

What are the options for glazing?

CERABIEN™ MiLai porcelains offer a self-glaze effect obtained by fine-polishing followed by glaze baking. This leads to a natural gloss, while maintaining the anatomical details. Alternatively, CERABIEN™ ZR FC Paste Stain Glaze or Clear Glaze can be applied and fixed by baking. These liquid ceramics allow users to add some structural details, while the surface appears glossier. However, the procedure is more time-consuming due to the additional application step.

Do you have any recommendations regarding the indication-specific selection of the framework or base material?

Traditionally, lithium disilicate has been the material of choice for aesthetic single anterior restorations, while zirconia has predominantly been used for multi-unit restorations and restorations in the posterior area. With the availability of KATANA™ Zirconia YML, STML / UTML and CERABIEN™ MiLai, zirconia is becoming

increasingly attractive for the production of minimally invasive veneers, crowns and the like. A thin-walled restoration made of KATANA™ Zirconia, speed-sintered in just a few minutes and combined with a thin layer of CERABIEN™ MiLai, results in an incredibly strong restoration with several aspects that lithium disilicate simply cannot match. The preparation technique for zirconia is much more favourable for dentists – for example marginal adaptation and biocompatibility, especially regarding gingival healing, are superior. Aesthetically, there is no risk of a greyish effect when using zirconia with CERABIEN™ MiLai, while lithium disilicate needs to be treated with Value Liner to prevent this. Additionally, the ease of cementation with PANAVIA™ SA Cement Universal further enhances the quality of the restoration in the fastest possible timeframe, allowing for quick and flexible responses to dentists' needs.

You mentioned speed sintering as a factor contributing to a streamlined workflow. Studies have shown, however, that this step might weaken the mechanical and aesthetic properties of zirconia. Do you recommend speed sintering despite this fact?

Indeed, speed sintering does affect the translucency and flexural strength of some zirconia variants. This is probably the reason why dental technicians have been reluctant to change their established practices of sintering overnight – despite the availability of high-speed furnaces. However, KATANA™ Zirconia is an exception: Due to our unique powder formulation, we are able to offer zirconia with a composition that is completely independent from other brands of dental zirconia. With this, we are able to fundamentally change the traditional workflow of an end-user and offer more flexibility, speed and efficiency, resulting in less energy consumption, stress and costs.* In a study conducted at the Division of Biomaterials at the University of Alabama at Birmingham[1],three different high-translucency zirconia materials including KATANA™ Zirconia Block (KATANA™ Zirconia STML) were sintered according to a traditional and a high-speed sintering schedule. Prior to sintering and afterwards, the three-point bending strength, translucency and grain structure were analysed. In this study, the material from Kuraray Noritake Dental Inc. was the only zirconia with properties that remained unaffected after speed sintering. Internal testing confirmed this finding for all variants of the KATANA™ Zirconia Multi-Layered series. As a result, we do recommend speed sintering of our materials, delivering true economic and time advantages.

With highly potent materials for micro-layering now available, do you think that full ceramic layering is going to be a thing of the past?

I am convinced that in the near future, the great majority of dental restorations will be produced using aesthetic framework materials and simplified micro-layering techniques. However, full porcelain layering is here to last. There will always be a demand for a few highly-skilled ceramists serving the needs of individuals with the highest aesthetic demands. It is like tailor-made versus off-the-peg suits: the tailor-made ones are the best you can buy, but most people wear off-the-peg ones, which are perfectly adequate in virtually every environment.

Thank you very much!

*

Speed sintering protocol of 54 minutes is available for a single-tooth restorations and two to three-unit bridges.

Reference 1

Lawson NC, Maharishi A. Strength and translucency of zirconia after high-speed sintering. J Esthet Restor Dent. 2020 Mar;32(2):219-225. doi: 10.1111/jerd.12524. Epub 2019 Sep 13. PMID: 31515932.

CERABIEN MiLai

FEATURES & BENEFITS

1 **COMPACT LINE-UP DESIGNED FOR MICRO-LAYERING**
for a minimized inventory, streamlined decision-making and a simple, efficient and economic finishing procedure

2 **LOW FIRING TEMPERATURE (740°C / 1,364°F)**
for compatibility with a broad range of restorative materials including zirconia and lithium disilicate* and a simplified inventory management

3 **UNIQUE PORCELAIN PROPERTIES**
based on synthetic feldspar for consistent handling and excellent mechanical properties; multiple firing is possible

**The material should have CTE value within 9.5~11.0×10⁻⁶/K (50~500 °C)*

Producing dental restorations that are not recognizable as such – this is probably the ultimate goal of every dental technician. For a long time, pursuing this goal was complicated by core materials whose optical properties were very different from those of natural teeth. The dark metal or opaque zirconia substructures had to be masked by applying multiple layers of intensively coloured ceramic powders, topped by more translucent porcelains imitating the enamel.

WELCOME TO THE FUTURE OF CERAMIC LAYERING

CASE BY MDT ANDREAS CHATZIMPATZAKIS AND MDT IOULIANOS MOUSTAKIS

The rise of modern, tooth-coloured core materials such as lithium disilicate and zirconia has changed the game. With a core that is highly aesthetic, translucent and close to the final shade, it became much easier to produce a restoration that is virtually indistinguishable from the adjacent teeth. The thickness of the porcelain layer decreased as did the number of shades to be combined and necessary bakes to be conducted. The use of the existing porcelain systems for the new micro-layering techniques posed several new challenges: those systems originally developed for opaque zirconia were indicated for the more translucent zirconia core materials, but usually not for lithium disilicate. Moreover, the complexity of the systems made their use unnecessarily complicated.

Consequently, Kuraray Noritake Dental Inc. developed a new porcelain system for micro-layering on zirconia and lithium disilicate core materials. The portfolio of CERABIEN™ MiLai, which refers to micro-layering and the Japanese word for future (mirai), consists of 15 internal stains (13 tooth colours including Bright to boost the translucent and Fluoro to boost the fluorescent effect, and two tissue colours) and 16 porcelains (12 tooth porcelains and four tissue porcelains). Hence, it enables dental technicians to implement a modernized version of the original Internal Live Stain Technique developed by Hitoshi Aoshima in the early 1990s in a porcelain layer of minimal thickness.

The following demo cases are used to show how to achieve lifelike aesthetic restorations based on aesthetic zirconia and on lithium disilicate. Illustrating each step, the cases allow users to anticipate how much time and effort can be saved compared to traditional layering techniques.

MAXIMALLY SIMPLE APPROACH ON LITHIUM DISILICATE

In this case, the idea was to restore the six maxillary anterior teeth in a simple way. The selected core material for the planned veneers was Amber Press (HASS Bio) LT in the shade B1. The lithium disilicate restorations were pressed with a micro cut-back and their fit was checked on the model, followed by surface texturing, sandblasting and steam cleaning. When the veneers are milled instead of pressed, the procedure is the same. After that, the restorations are ready for the application of the CERABIEN™ MiLai internal stains for characterisation of the core. In order to achieve the desired result, it is critical to mix the selected stains with the internal stain Bright responsible for a translucent effect. Subsequently, the veneers were built up to their final anatomy with selected CERABIEN™ MiLai Porcelains to imitate the enamel and create a window effect. In this approach, simple layering and a single bake are sufficient to create the desired restoration. After glazing with Clear Glaze, finishing of the restorations was accomplished with paper-abrasive cones, a rubber polisher and polishing paste.

CASE #01

Figure 1a
Pressed lithium disilicate veneers after surface optimization (grinding), sandblasting and steam cleaning on the model.

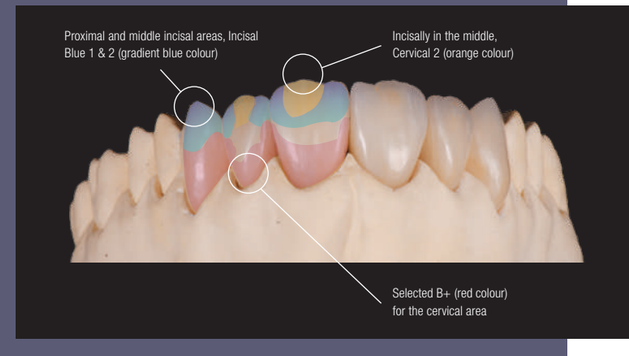


Figure 1b
Chroma map for the application of CERABIEN™ MiLai Internal Stains to the lithium disilicate surface. We selected B+ (red colour) for the cervical area. For the proximal and middle incisal areas, Incisal Blue 1 & 2 (gradient blue colour) were applied and incisally in the middle, we chose Cervical 2 (orange colour). Tip: all internal stains were mixed with Bright and IS Liquid.

Figure 1c
Appearance of the veneers after the application of CERABIEN™ MiLai Internal Stains.

Figure 1d
CERABIEN™ MiLai Porcelains applied on top of the internal stains: LT1 is used for the cervical area (red) and a mixture of Tx and E2 (30:70 ratio) for the middle and the incisal third.

Figure 1e
The final restorations after glazing with Clear Glaze and mechanical polishing.

Images
Courtesy of MDT Andreas Chatzimpatzakis

ADVANCED APPROACH
ON LITHIUM DISILICATE

CASE #02

To imitate a more complex inner colour structure with mamelons, different levels of translucency and more individual effects, a slightly more advanced micro-layering approach was selected. Again, the core was produced using Amber Press (HASS Bio) in the LT variant and the shade B1. After pressing and fitting on the model, we reduced the incisal third to create space for the transparent porcelain. Subsequently, an extremely thin layer of CERABIEN™ MiLai Porcelain adding translucency to the enamel surface (Tx) was applied in the incisal third of the veneers. In this way, it is possible to create an optimally translucent basis for the application of the internal stains. The first bake was conducted and the surfaces were sandblasted as well as steam cleaned to create the conditions needed for internal staining. After internal stain application, a final layer of CERABIEN™ MiLai Porcelain was applied. All four incisors received a layer of LTx to add ultimate translucency and opalescence to the enamel, while LT1 was the material of choice in the cervical third of the canines, where LTx completed the layer in the other areas. As LT1 is slightly less translucent and opalescent, a natural effect is obtained in this way. The last steps were glazing and mechanical polishing.

Figure 2a
Lithium disilicate veneers reduced for the advanced layering procedure involving more porcelains and bakes.

Figure 2b
Thin layer of Tx applied to the incisal third of the restorations to boost the translucency in this area.

Figure 2c
Appearance of the veneers after the first bake.

Figure 2d
Ceramic surfaces after sandblasting and steam cleaning.

Figure 2e
Chroma map for the application of the internal stains. Cervical 2 was used for the cervical third, Incisal Blue 2 for the proximal regions and Mamelon Orange 2 for the mamelons. As mentioned before, the selected internal stains were mixed with Bright.

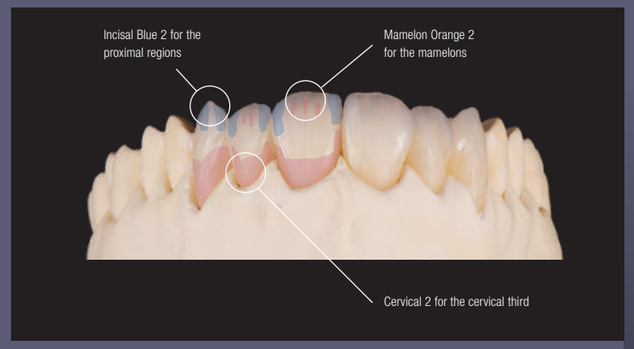


Figure 2f
Appearance of the veneers after the bake of the applied CERABIEN™ MiLai Internal Stains.

Figure 2g
Final build-up to reach the desired shape of the veneers. LTx is the only material applied to the central and lateral incisors, while the canines are built up with LTx in the incisal and middle and LT1 in the cervical third.

Images
Courtesy of MDT Andreas Chatzimpatzakis

Figure 2h
Glazed and polished veneers on the model.

Figure 3a
Milled restoration after surface texturing.

CASE #03

ADVANCED APPROACH
WITH GUM AREAS ON ZIRCONIA

In this case, a highly complex ten-unit bridge with gum parts in the anterior region had to be produced. The selected framework material was KATANA™ Zirconia HTML Plus (Kuraray Noritake Dental Inc.), which offers a multi-layered colour structure, an optimized translucency and the high flexural strength required for long-span bridges. The restoration was milled in an anatomically reduced design and the surface texture was optimized with rotating instruments before sintering. After the final sintering procedure, the restoration had a favourably high translucency in the incisal region and a natural shade structure. In the first step of the micro-layering procedure, the application of CERABIEN™ MiLai Internal Stains was planned and carried out. Subsequently, different layers of CERABIEN™ MiLai Porcelain were applied. In the next step, the gum areas were completed using the CERABIEN™ MiLai tissue porcelains Tissue 4, 5 and 6. In the final layer, Tissue 1 was mixed with ELT1 to imitate the labial frenulum and with LTx to create a smooth transition to the natural gingiva.

Figure 3b
Shade and translucency of the sintered zirconia restoration.

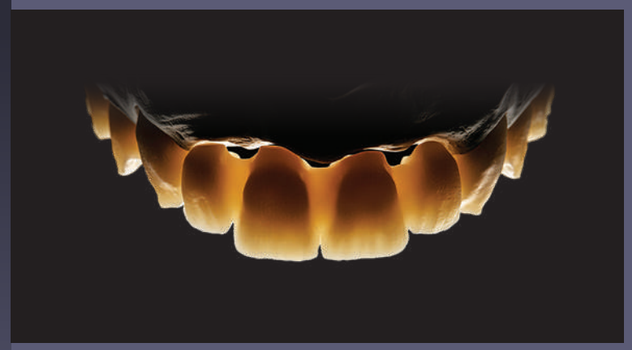


Figure 3c
Highly translucent bridge on the model.

Figure 3d
Chroma map for the application of CERABIEN™ MiLai Internal Stains.

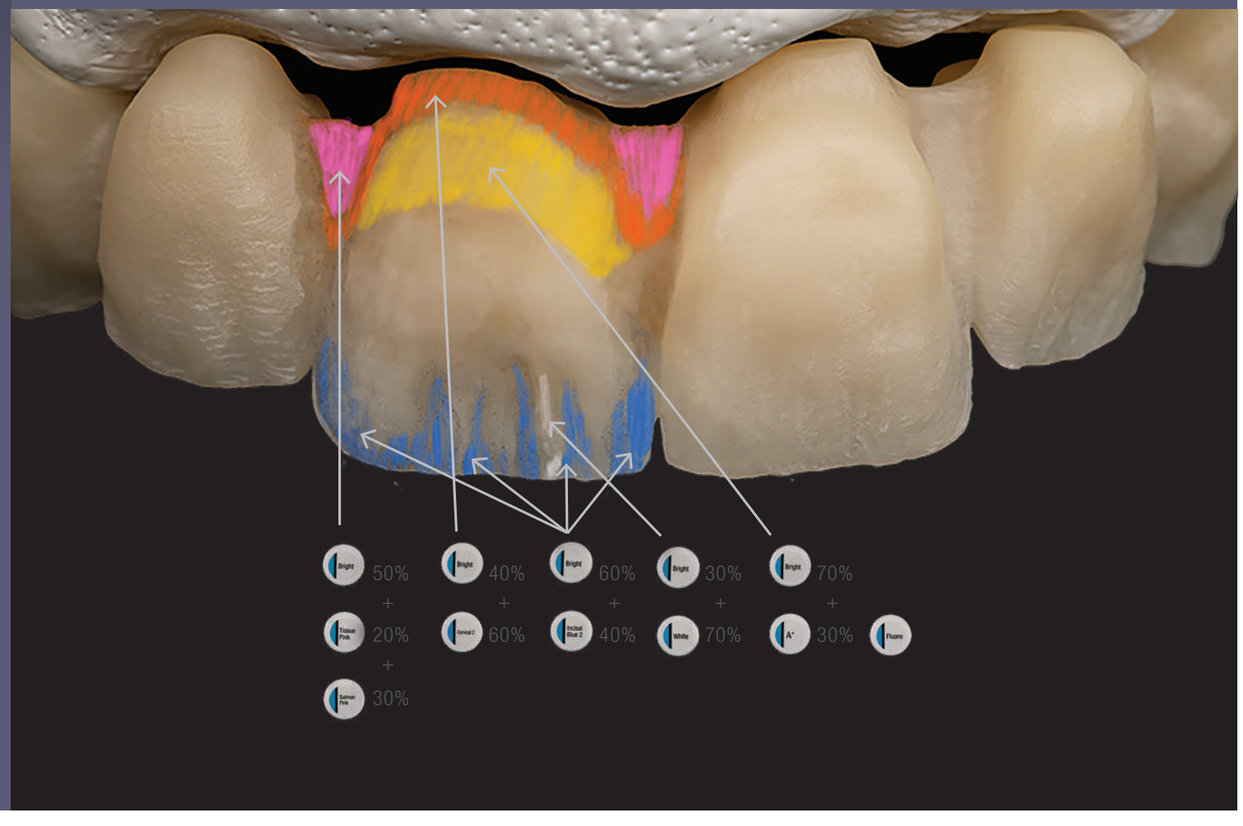


Figure 3e
Applying a mixture of Bright, Salmon Pink and Tissue Pink to the gum area.

Figure 3f
Application of CERABIEN™ MiLai.

Figure 3g
Application of Tx and a mixture of Tx and CCV-2 to individualize the cervical and incisal areas while boosting the translucency of the enamel in the middle and incisal third.

Figure 3h
Adding a final layer of LT1 for additional translucency and opalescence.

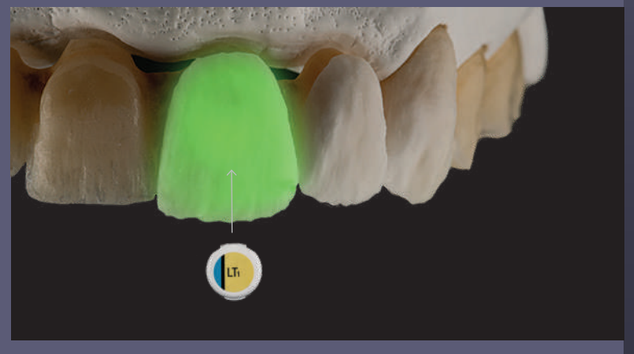


Figure 3i
Appearance of the ten-unit bridge before the bake – labial view.

Figure 3j
Appearance of the ten-unit bridge before the bake – palatal view.

Figure 3k
Appearance of the ten-unit bridge after the bake.

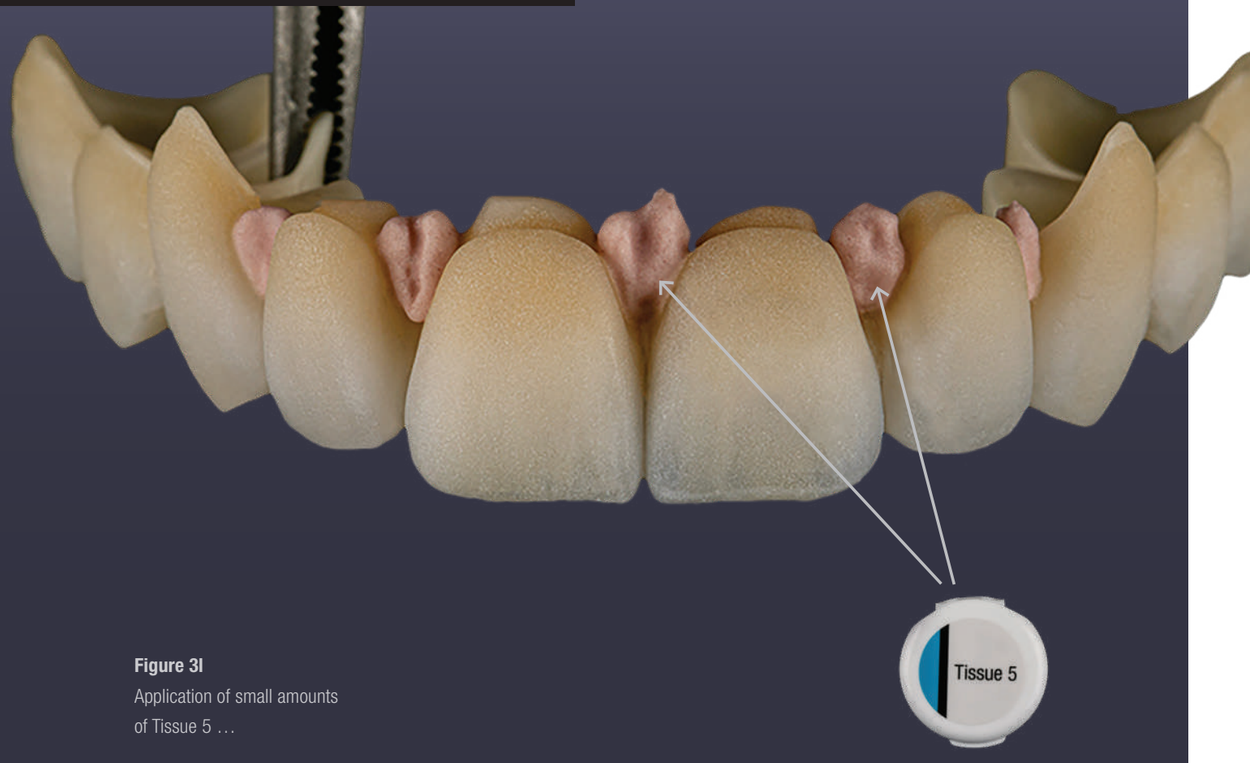


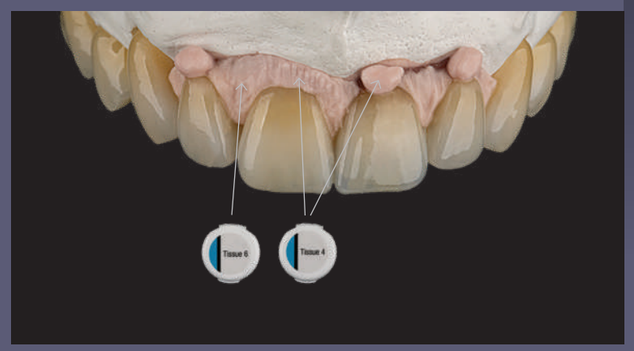
Figure 3l
Application of small amounts of Tissue 5 …

Figure 3m
... covered with a layer of Tissue 6 alternating with Tissue 5.

Figure 3n
Following another bake, Tissue 5 was applied in the proximal areas.

Figure 3o
How to combine Tissue 6 and Tissue 4 in the next layer.

Figure 3p
How to complete the tissue layer with Tissue 1, locally mixed with ELT1 or LTx.



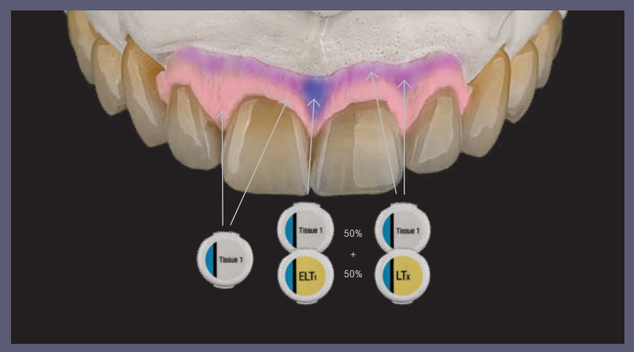


Figure 3q
Restoration before the final bake.

Figure 3r
Final ten-unit bridge ready for placement.

FINAL-
SITUA-
TION

Images
Courtesy of MDT Ioulianos Moustakis

THE NEW WAY OF MICRO-LAYERING WITH CERABIEN™ MiLai

CASE BY MDT ANDREAS CHATZIMPATZAKIS

With CERABIEN™ ZR, Kuraray Noritake Dental Inc. offers a whole porcelain portfolio for the finishing of restorations based on zirconia. Originally developed for complex layering techniques, the synthetic feldspathic porcelain powders, liquid ceramics, internal and external stains allow for the creation of beautiful dental artwork. We love to work with the system as it offers consistent handling and mechanical properties, allowing us to produce predictable outcomes.

However, the complexity of the system with its huge number of different shades can pose challenges to less experienced users. This complexity is further increased when different substructure materials are used, as CERABIEN™ ZR works exclusively on zirconia, so that users would need to select and manage a second porcelain system when opting for a lithium disilicate framework, for example.

For dental technicians who would like to keep it smartly simple, the new CERABIEN™ MiLai line-up is certainly a great solution. Specifically developed for micro-layering on pre-shaded, highly translucent substructure materials such as lithium disilicate or a latest-generation zirconia, CERABIEN™ MiLai porcelains and internal stains may be applied in a thin (micro-) layer on restorations with a small (vestibular) cut-back. Just like CERABIEN™ ZR, the new system is based on synthetic feldspathic porcelain delivering consistent properties, but the line-up is reduced to 15 internal stains and 16 porcelains. As the CERABIEN™ MiLai has a firing temperature of 740 °C (1,364 °F), it works on oxide ceramics like zirconia, but also on reinforced silicate ceramics like lithium disilicate*.

Consequently, the system may be used as the universal porcelain system for micro-layering on aesthetic ceramics. With its slim portfolio, it fits the philosophy of creating impressive restorations with fewer components, layers and bakes very well, as demonstrated in two different case examples below.

**The material should have CTE value within 10.2-10.5×10-⁶/K (50 °C – 500 °C)*

VENEERS
BASED ON LITHIUM DISILICATE

CASE #04

Figure 1
Six anterior veneers made of lithium disilicate (Amber Press LT A2 HASS Bio), designed with a slight cut-back to create the space needed for micro-layering.

Figure 2
Restorations after the application of CERABIEN™ MiLai Value Liner 1 followed by wash firing and internal staining. This type of porcelain increases the value of lithium disilicate restorations. By staining the core, we control the chroma and add some internal characteristic effects. In this case, we added Cervical 2 to the marginal area and characterized the incisal third with Cervical 2 and Incisal Blue 1 & 2.

Figure 3
First porcelain layer consisting of CERABIEN™ MiLai LT1 applied to the cervical, ELT1 to the mesial third and Tx to the incisal third before …

Figure 4
… and after the first bake.

Figure 5
Application of internal stains for special effects like cracks, intense chroma etc.

Figure 6
Second porcelain layer consisting of CERABIEN™ MiLai LT1 applied to the canines as well as the cervical third of the central and lateral incisors, while the middle and incisal third of the four incisors is individualised with LTx.

Figure 7
Finished restorations on the master cast.

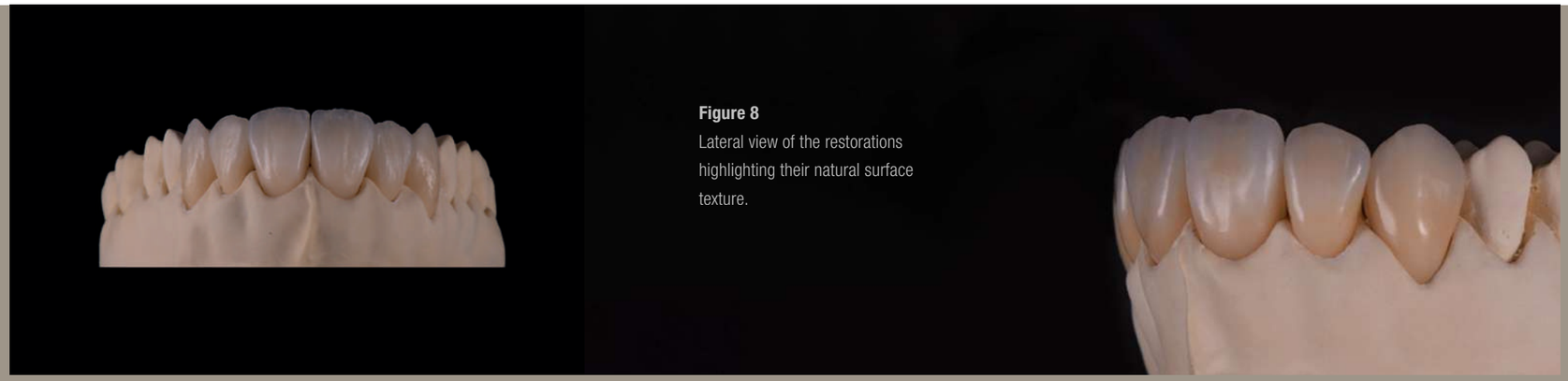


Figure 8
Lateral view of the restorations highlighting their natural surface texture.

CASE #05

ANTERIOR BRIDGEWORK BASED ON ZIRCONIA

Figure 1
KATANA™ Zirconia HTML Plus (A2 shade) structure immediately after milling.

Figure 2
Appearance of the substructure after sintering.

Figure 5
Restoration ready for try-in.

Figure 3
High translucency of the zirconia with the applied CERABIEN™ MiLai stains and porcelains on teeth and gingiva.

Figure 4
Palatal view of the individualized restoration before the firing process.

CONCLUSION

The two different cases confirm that CERABIEN™ MiLai works very well on lithium disilicate and zirconia. Despite the reduced number of stains and shades, it is possible to imitate most of the shades and individual effects found in natural teeth, which are important for lifelike outcomes. Hence, the new material is worth a try for everyone who prefers standardized and simplified procedures.

For zirconia-based screw-retained implant-supported prostheses, diverse finishing concepts are available. Most of them are quite complex and time-consuming. A streamlined approach that brings efficiency into the finishing procedure without compromising aesthetics and function is micro-layering with CERABIEN™ MiLai on a zirconia superstructure with just a slight vestibular cutback. A possible technical procedure is demonstrated using the following case example. The patient was treated by prosthodontist Dr. Georgios Siavikis from Ioannina, Greece.

CASE BY MDT ANDREAS CHATZIMPATZAKIS

MICRO-LAYERING: A GREAT CONCEPT FOR ZIRCONIA-BASED SCREW-RETAINED IMPLANT-SUPPORTED PROSTHESES

Figure 1
Occlusal view of an implant-supported overdenture made of KATANA™ Zirconia HTML PLUS for a male patient with an edentulous maxilla and a removable partial denture in the mandible.

Figure 2
Frontal view of the milled and sintered screw-retained implant-supported prosthesis.

Figure 3
Appearance after the application of CERABIEN™ MiLai SS Fluoro and internal stains to enhance the natural shading of the restoration in the tooth and gum areas.

Figure 4
Result of micro-layering with CERABIEN™ MiLai porcelains LT1 for the cervical as well as E2 and Tx for the middle and incisal sections for a seamless gradient in translucency. For an optimal gingival harmony and match with the surrounding tissue, the tissue shades 1, 5 and 6 were applied.

Figure 5
Finished restoration.

Figure 6
The gingiva and tooth areas have a natural appearance …

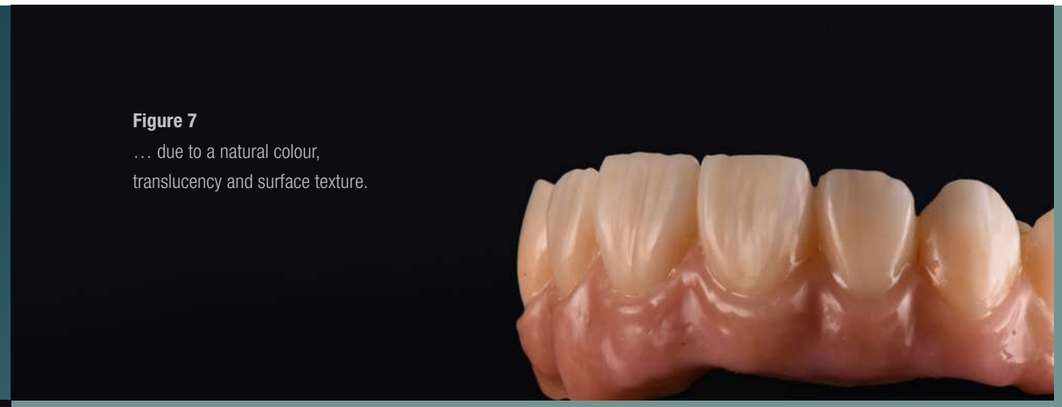


Figure 7
… due to a natural colour, translucency and surface texture.

PREDICTABLE OUTCOMES

In this case, the use of an aesthetic, high-strength multi-layered zirconia was a true enabler of a streamlined finishing technique. As a convinced and frequent user of CERABIEN™ ZR, micro-layering with CERABIEN™ MiLai appeared to work flawlessly right from the start. The systems are perfectly aligned to each other, and as they are both based on synthetic feldspathic technology, they offer consistent material properties. These provide precise control over the layering and shading, thus supporting a highly aesthetic and well-integrated implant restoration.

INTERVIEW WITH TOMOHIRO EMOTO

TOMOHIRO EMOTO
R&D Department Technical Group Manager
Japan Academy of Esthetic Dentistry Executive Member
Academic Lecture Committee Member

THE DEVELOPMENT OF CERABIEN™ MiLai PORCELAIN AND INTERNAL STAIN

Kuraray Noritake Dental Inc. launched its first porcelain for porcelain-fused-to-metal restorations – Noritake Super Porcelain AAA*, still available after more than 30 years under the name Noritake Super Porcelain EX-3* – in 1987. The knowledge acquired since then formed the basis for the development of CERABIEN™ ZR and the brand-new CERABIEN™ MiLai portfolio.

How much of Noritake Super Porcelain is found in CERABIEN™ MiLai?

Naturally, the knowledge we have acquired on developing porcelain products has been fully applied in the development of CERABIEN™ MiLai. The methods used to handle synthetic feldspar – such as low firing technologies, stable thermal expansion even with multiple baking, particle distribution control – are amongst the most important findings since the development of Noritake Super Porcelain AAA. This expertise has been utilized to create the design concept and to develop CERABIEN™ MiLai.

What are the most decisive differences from other porcelains?

The most decisive difference between CERABIEN™ MiLai and other porcelains is that we focus on the micro-layering technique with this product. CERABIEN™ MiLai enables you to express lifelike colours even with thin layers of porcelain. Also, this is the first porcelain we have launched which is compatible with lithium disilicate as well as zirconia.

**Noritake Super Porcelain AAA and Noritake Super Porcelain EX-3 were designed and launched by Noritake Company Ltd., the predecessor of Kuraray Noritake Dental Inc.*

With CERABIEN™ ZR being available and clinically successful, why did you decide to develop a new line of porcelains and internal stains?

The best way that we propose to create aesthetic restorations is Porcelain Fused to Zirconia (PFZ) with CERABIEN™ ZR. However, this method requires high levels of expertise and experience, which involves a lengthy learning curve for beginner dental technicians. As a result, Full-Contour Zirconia (FCZ), which does not require such advanced skills and expertise, and which allows virtually anyone to create (albeit not perfect but nevertheless acceptable) restorations, is becoming increasingly popular. CERABIEN™ MiLai sits in the middle of these two methods. It enables technicians to create more aesthetic restorations with a simple, single micro-layering technique, making it ideal for those who wish to produce aesthetic restorations but without the high learning-curve associated with the traditional method, or those who use lithium disilicate materials.

Is CERABIEN™ MiLai the answer to the new generation of millable ceramic materials such as the entire KATANA™ Zirconia line?

Yes, it is. Formerly, zirconia materials were mono-coloured and not translucent. However, the improvement of zirconia materials, which began with KATANA™ Zirconia ML followed by KATANA™ Zirconia STML/UTML and KATANA™ Zirconia YML, has been an ongoing process and the aesthetics of the material itself is now very high thanks to improvements in translucency. This has led to the development of CERABIEN™ MiLai, a simple product that can achieve highly aesthetic restorations with thin layers, making the most of the high translucency of the zirconia materials.

What are the specific needs of users favouring the micro-layering technique with respect to features of the veneering porcelain?

When dental zirconia materials were first launched, chipping issues with porcelains for dental zirconia materials were a problem. At that time, dental porcelains were built up on a zirconia framework, the design of which failed to take into account the final shape. As a result, dental technicians were prone to building

‘CERABIEN™ MiLai ENABLES YOU TO EXPRESS LIFELIKE COLOURS EVEN WITH THIN LAYERS OF PORCELAIN’.

– Tomohiro Emoto –

KATANA™ Zirconia Multi-Layered discs.

excessive thickness into porcelain layers which were unable to resist high occlusal pressure. Nowadays, it is standard for the final shape to be taken into account in the framework design resulting in reduced chipping. I must mention here that CERABIEN™ ZR, which was launched at that time, showed a higher endurance ratio than others in trials and was well accepted by the market.
What we want to offer with CERABIEN™ MiLai is a similar or developed version concept of this framework design. You can reduce the risk of problems after placement of the restoration by minimizing the porcelain thickness while maximizing the area of dental zirconia, which has such strong properties that almost no chipping issue can be expected.

As a result, the micro-layering technique, which can prevent post-placement problems, should prove ground-breaking for dental technicians.

What did you do to meet these demands?

The thinking behind the development of CERABIEN™ MiLai has been to focus on delivering thin layering that replicates the enamel structure, thus allowing technicians to achieve desired shades regardless of the depth of a layer.

How did you manage to decrease the firing temperatures and what is the effect of this feature?

Up to now, it has generally been tricky to achieve low firing temperature while maintaining a low coefficient of thermal expansion, because they contradict each other. However, thanks to the technologies and knowledge we have cultivated since the development of Noritake Super Porcelain AAA, we could finally be breaking through this obstacle. As a result, CERABIEN™ MiLai can even be used with lithium disilicate materials, which should be baked at low temperature to avoid damaging the material.

CERABIEN™ MiLai can be applied not only to zirconia but also to lithium disilicate materials. Have new shades/masses been specially developed that have been perfectly adapted for lithium disilicate materials?

The Value Liner has primarily been developed to achieve high aesthetics from lithium disilicate materials, even lithium disilicate which has high translucency compared to zirconia materials. Also, the key for adapting for lithium disilicate is the firing temperature which I mentioned earlier. To match the colour of restoration with the tooth, the selection of framework colour is important both for lithium disilicate materials and zirconia materials. We recommend selecting one shade brighter than the target shade taking into consideration the utilization of internal stain to express the detailed character of a tooth.

‘CERABIEN™ MiLai CAN EVEN BE USED WITH LITHIUM DISILICATE MATERIALS, WHICH SHOULD BE BAKED AT LOW TEMPERATURE TO AVOID DAMAGING THE MATERIAL’.

– Tomohiro Emoto –

What did you do to enable the imitation of virtually every tooth shade with just 16 porcelains and 15 internal stains?

We have prepared Value Liner porcelains, which can be utilized for adjusting the value of restorations. These Value Liner porcelains and internal stains are important to adjust colour and express detailed characters. As micro-layering does not require body porcelains, since it is expected that the framework material itself – either zirconia or lithium disilicate – would express the dentin structure, adjusting the colour and value respectively with internal stains and Value Liners is essential. To reproduce the enamel structure, users can use the 16 shades of porcelains as they are, or they can mix the shades to find the desired colour. These 16 porcelains and 15 internal stains have undergone trials conducted by dental experts worldwide. We want to assure you that even the most skilled professionals have tested and confirmed the quality and effectiveness of our CERABIEN™ MiLai.

What is the benefit of this slim line-up?

The biggest benefit of CERABIEN™ MiLai is a simple procedure. Thanks to its simplicity, not only our current porcelain product users but also new users and beginners can achieve excellent results with this porcelain series without struggling with complicated procedures.

How long did it take you to develop CERABIEN™ MiLai (from the initial idea to the available product)?

We initially came up with the concept in 2015 when KATANA™ Zirconia STML and UTML were launched. The development project itself was started in 2019.

Did you come across any specific challenges during the development process?

The biggest challenge we faced was the development of a material which would be compatible with lithium disilicate. We had already produced porcelains which are compatible with zirconia or metal, but up to that point we had not created porcelains for lithium disilicate before CERABIEN™ MiLai. Not only did we have to develop the material within our R&D department, but also alter the production and inspection processes in collaboration with many other departments.

The product name CERABIEN™ MiLai is derived from the word “mirai”, which means as much as “future” in Japanese. Is this material a pioneer for the future production of highly aesthetic restorations?

We created CERABIEN™ MiLai believing that the micro-layering technique would become the standard in porcelain restorations and that CERABIEN™ MiLai would become the material of choice for dental technicians.

Building up dental porcelains is not an easy process; it takes time to acquire the knowledge and master the technique. On top of this, dental technicians have long been plagued with post-placement problems such as chipping.

Micro-layering with CERABIEN™ MiLai enables every dental technician, from newcomers through to those with many years’ experience, to create better restorations. It is our hope that dental technicians everywhere will get to experience the ease at which aesthetic restorations can be realised with CERABIEN™ MiLai, just adding one step of micro-layering.

What is your vision with regard to future developments in the area of porcelain for ceramic layering?

Personally, I think the trend will continue to shift towards easier handling while maintaining good aesthetics, as can be seen by the recent increase in popularity of the micro-layering technique.

What about the potential of new ceramic CAD/CAM materials and their suitability for monolithic use?

Image: Courtesy of MDT Andreas Chatzimpatzakis

‘WE CREATED CERABIEN™ MiLai BELIEVING THAT THE MICRO-LAYERING TECHNIQUE WOULD BECOME THE STANDARD IN PORCELAIN RESTORATIONS AND THAT CERABIEN™ MiLai WOULD BECOME THE MATERIAL OF CHOICE FOR DENTAL TECHNICIANS’.

– Tomohiro Emoto –

We believe that monolithic use will increase further, because the perception of aesthetics is changing among patients as well as dentists and dental technicians. Before, a “natural” restoration was considered acceptable; now it can also be “cosmetically” aesthetic. Formerly, it was said that monolithic use was not suitable as it could not reproduce lifelike restorations. Now, we believe it will be increasingly embraced as patients show a demand for cosmetically aesthetic restorations.

Our KATANA™ Zirconia has mechanical advantages: high strength and high translucency, and high potential in longevity. Since dental zirconia appeared in dental material market, its aesthetics have been improved remarkably. And we, at Kuraray Noritake Dental Inc., have been developing outstanding CAD/CAM materials and will continue creating innovative materials from now on, too.
We are convinced that developing better products for monolithic use is crucial for releasing dentists and dental technicians from complicated procedures, while at the same time giving patients a sense of safety as well as aesthetic satisfaction.

Why should a dental technician test CERABIEN™ MiLai?

We are convinced that, once dental technicians who use either zirconia materials or lithium disilicate to make restorations, experience the ease at which they can achieve aesthetically pleasing restorations with CERABIEN™ MiLai, demand will grow. We would therefore like to encourage all dental technicians to give it a go and see the results for themselves!

Is there anything else you would like to add for customers?

Thank you so much for reading this article to the end. I am very honoured to finally launch CERABIEN™ MiLai. This product is the result of many struggles. I am firmly convinced that it is the answer for any dental technician eager to realise high levels of aesthetics in a restoration in just a simple step. I would ask them to please try out CERABIEN™ MiLai for themselves and experience what will become standard practice in the future, right now.

CASE BY MDT ANDREAS CHATZIMPATZAKIS

MICRO-LAYERING: ARE THERE BENEFITS OF USING A DEDICATED PORCELAIN SYSTEM?

When dental technicians from all over the world started using the micro-layering technique, they simply combined a reduced number of porcelains and stains from their original porcelain system. After some time, porcelains specifically designed for micro-layering were introduced to the dental market. Consequently, early adopters had to decide whether or not to switch to one of those new systems.

Figure 1 (left page)
Initial situation: The patient was unhappy with his lip line and facial appearance, …

Figure 2
… particularly due to discoloured composite restorations and severe wear in the maxillary anterior region.

Figure 3
Shade determination after tooth preparation.

For me as a frequent user of CERABIEN™ ZR (Kuraray Noritake Dental Inc.), a porcelain system based on synthetic feldspathic porcelain developed for porcelain layering on zirconia frameworks, switching to any micro-layering porcelain system was not an option. However, when I had the chance to test the brand-new CERABIEN™ MiLai porcelains and internal stains (Kuraray Noritake Dental Inc.), I grabbed it for two reasons. Firstly, the simplicity! I was surprised how easily I could achieve a high aesthetic result without using too many different ceramic powders. Secondly with this system, I have a micro-layering porcelain system at my disposal that works for both, zirconia and lithium disilicate. Furthermore, the product is well-aligned to CERABIEN™ ZR – and offers a very similar handling.

CASE EXAMPLE

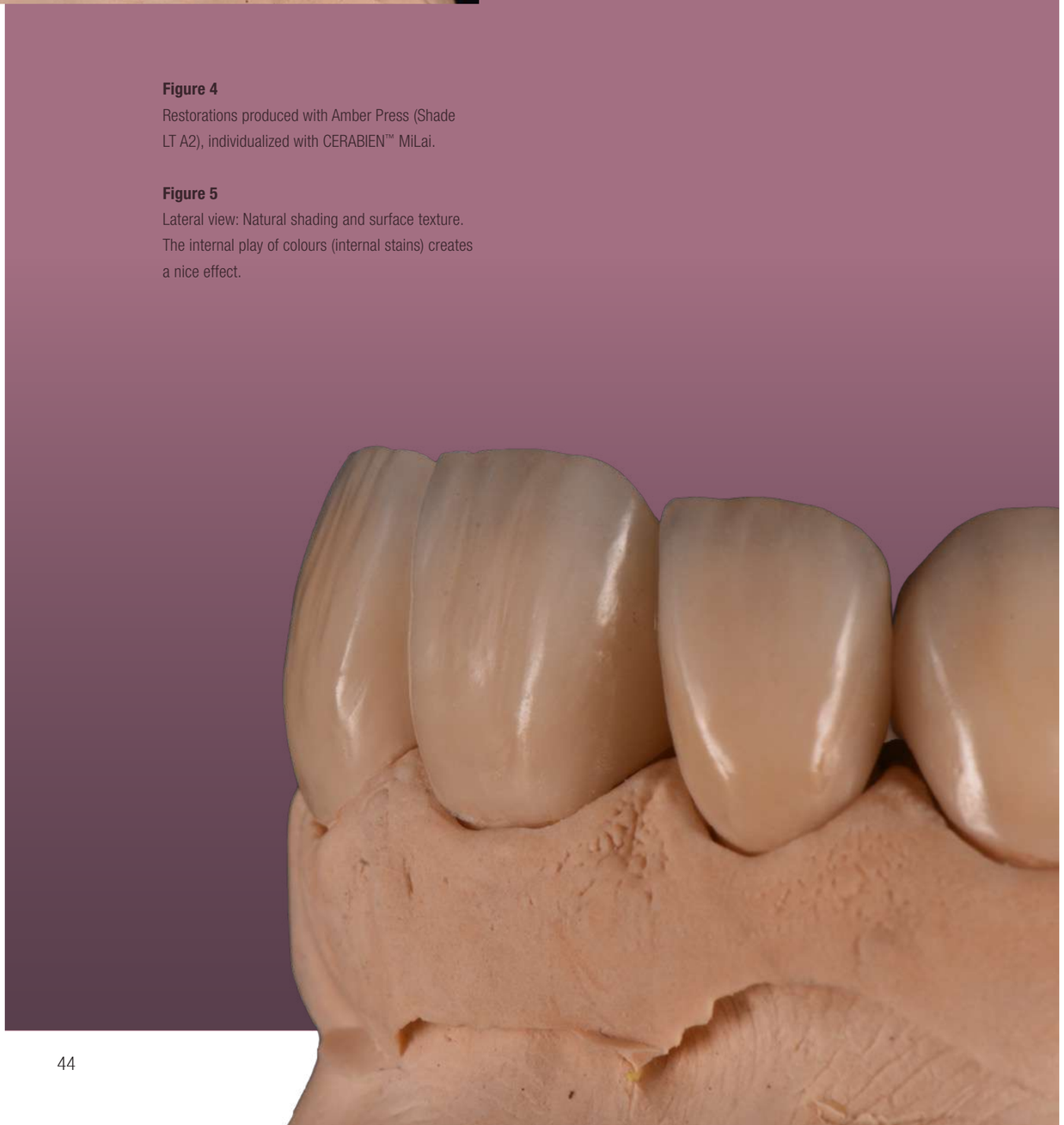
The following case is a nice example of how it may be used in the anterior region. The male patient had already been treated with monolithic zirconia crowns from another dental laboratory in the posterior region. Now, he desired a maxillary anterior smile makeover due to discoloured composite restorations and signs of tooth wear. The decision was made to produce six veneers with frameworks made of lithium disilicate (Amber Press), individualized with CERABIEN™ MiLai using the micro-layering technique. I would like to thank the prosthodontist Dr Konstantina Aggelara for the excellent teamwork and the intra-oral photos.

For layering, I simply applied CERABIEN™ MiLai Value Liner 1. Then, I used CCV2 in the cervical and Tx in the incisal area, as well as Liner 2 for the mamelons. Internal stains were applied after the first bake. Subsequently, the canines were completed with LT1. The lateral and central incisors were built up with LT1 in the cervical area, Creamy Enamel on the marginal ridges and the middle and E2 mixed with Tx in the ratio 70/30 in the incisal area.

CASE #07

Figure 4
Restorations produced with Amber Press (Shade LT A2), individualized with CERABIEN™ MiLai.

Figure 5
Lateral view: Natural shading and surface texture. The internal play of colours (internal stains) creates a nice effect.



FINAL SITUATION

THE PERFECT COMPLEMENT TO MY STANDARD PORCELAIN SYSTEM

As hoped, CERABIEN™ MiLai offers similarly great handling properties as CERABIEN™ ZR – probably mainly due to the fact that it is also based on synthetic feldspathic ceramic. It is not only responsible for consistent handling, but also for predictable optical properties, eliminating unwanted shadow effects. As the system is designed for micro-layering, it offers a natural appearance when applied in thin layers. This fact – in addition to the broader compatibility (to high-strength oxide and silicate ceramics) – makes it worthwhile to consider using a specific porcelain system for micro-layering. Experience shows that it works just as well on zirconia as it does on lithium disilicate, so that combining both framework materials in a single patient becomes a lot easier, while the line-up is neat.

Figure 6a and 6b
Restorations placed in the patient's mouth.

MADE FOR LITHIUM DISILICATE: PUTTING CERABIEN™ MiLai TO THE TEST

CASE BY MDT ANDREAS CHATZIMPATZAKIS

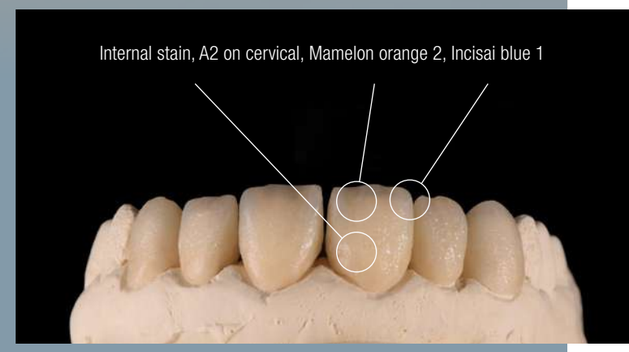
Nowadays, lithium disilicate and highly translucent variants of zirconia are among the most popular ceramic materials processed in the dental laboratory. Their favourable optical properties allow us to opt for simplified finishing approaches such as micro-layering in a great majority of cases. For dental technicians, this means a reduction of the manual workload without compromising the quality of the outcomes.

Recently, Kuraray Noritake Dental Inc. has launched a new set of porcelains and internal stains specifically developed for micro-layering, which works not only with zirconia but also with lithium disilicate. The CERABIEN™ MiLai line-up consists of 16 porcelains and 15 internal stains, which – the manufacturer claims – are easy to select and manage. As the more universal approach with a single porcelain for silicate ceramics and zirconia enables us to streamline inventory management and to standardize layering procedures, we decided to test the new product in the laboratory setting. The following case is a documentation of the first try of CERABIEN™ MiLai on lithium disilicate (Amber Press, HASS Bio).

Figure 1 (top page)
Anatomically reduced crown structures made of lithium disilicate (Amber Press LT, shade A2).

Figure 2
Crowns after the application of CERABIEN™ MiLai Value Liner 1 generally used to increase the value of lithium disilicate restorations, followed by wash firing.

Figure 3
Situation after the application of CERABIEN™ MiLai Internal Stains: A+ is applied in the cervical area to enhance the chroma, and Mamelon Orange 2 alternating with Incisal Blue 1 are used to imitate the mamelon structures in the incisal area.



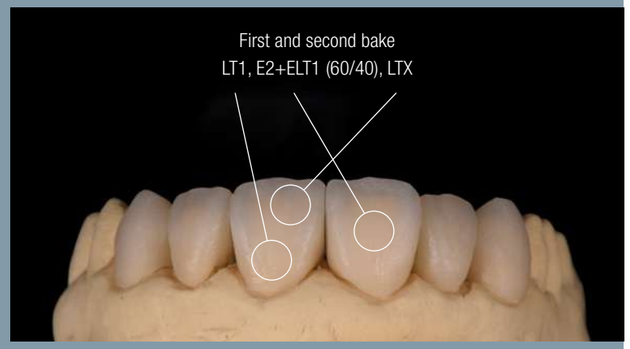


Figure 4
Crowns after the first and second bake with CERABIEN™ MiLai Porcelain LT1 applied in the cervical area to add translucency and opalescence to the enamel, E2 mixed with ELT (ratio: 60/40) to optimize the body area and LTx to boost the incisal translucency and opalescence.

Figure 5
Restorations finalized with CERABIEN™ ZR FC Paste Stain Clear Glaze and external stains to add some lines incisally.

Figure 6
Lateral view of the restorations.

Figure 7
Natural translucency and internal optical structure revealed in transmitted light.

CONCLUSION

The outcome achieved at the first go with the CERABIEN™ MiLai line-up for micro-layering on lithium disilicate is very satisfying. I feel that we can achieve great results with this system, which is indeed easy to select and manage. The reduced number of shades clearly comes in handy especially for beginners, who will be grateful for the option of creating lifelike restorations with fewer decisions to be made, and less effort involved compared to conventional ceramic line-ups. The possibility of standardizing and streamlining procedures by using a single porcelain system for all micro-layering procedures is likely to improve the life of every dental technician.

Virtually every patient in need of restorative treatment desires functional restorations with an aesthetic appearance. However, the individual expectations and needs may be very different depending on the clinical situation (state of the natural tooth structure, parafunctional behaviour, periodontal health etc.), the patient's financial resources and personal preferences. A versatile material combination fulfilling many different needs and desires is KATANA™ Zirconia YML finished using micro-layering with the new CERABIEN™ MiLai (both Kuraray Noritake Dental Inc.).

CASE BY DT KOSTIA VYSHAMIRSKI

A DYNAMIC DUO FOR NATURAL-LOOKING, FUNCTIONAL RESTORATIONS: KATANA™ ZIRCONIA YML AND CERABIEN™ MiLai

CASE #09

This system supports low invasive preparations due to a favourable minimum wall thickness of the merely monolithic multi-layered zirconium oxide prosthesis and a minimal thickness of the porcelain layer in the aesthetic zone. Moreover, the high strength zirconium oxide prosthesis combined with only a very thin layer of porcelains makes this technique extremely useful in patients with parafunctional habits like bruxism. Last but not least, consisting of a carefully compiled selection of internal stains and porcelain shades, CERABIEN™ MiLai supports the creation of individual 3D shade effects that mimic those of natural teeth even when space is limited. The following case example reveals how this is possible.

INITIAL SITUATION

The patient presented with concerns related to both function and appearance. During the diagnostic phase, it was determined that increasing the vertical dimension of occlusion (VDO) and creating a wax-up in the new jaw position would be necessary to improve both the occlusion and the aesthetic appearance of the smile.

Figure 1
Intraoral scan of the maxillary teeth revealing severe tooth wear.

Figure 2
Intraoral scan of both jaws confirming the need for an increase of the VDO.

Figure 3
Intraoral scan: Occlusal view of the maxillary teeth.

Figure 4
Minimally invasive preparations for the crowns.

TREATMENT PLANNING AND COMPUTER-AIDED DESIGN
Following the approval of the wax-up, the treatment plan was created. It consisted of restoring the four anterior incisors with zirconia crowns and performing direct composite restorations on the posterior and lower teeth. To conserve as much of the healthy tooth structure as possible, the space created was aligned to the required wall thickness of the planned restoration (framework + micro-layer of porcelain in the vestibular areas only).

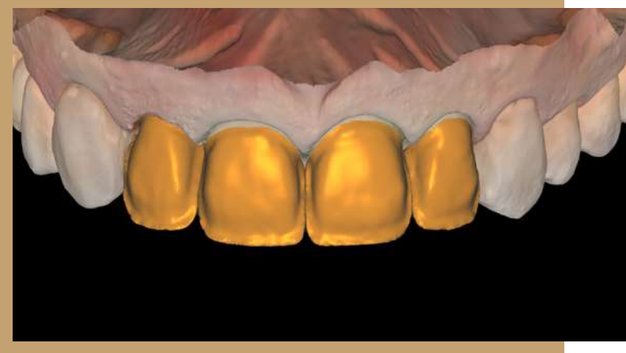
Following an aesthetic analysis, the crowns were designed with a minimal vestibular cutback. This was due to the patient's functional problems, which would increase the chipping risk in case of using a more heavy cutback design with a thicker, more conventional porcelain layer. KATANA™ Zirconia YML offers exceptional aesthetics, requiring only a 0.3 mm reduction for the porcelain to achieve natural results. Therefore, it was the logical material choice for this specific case.

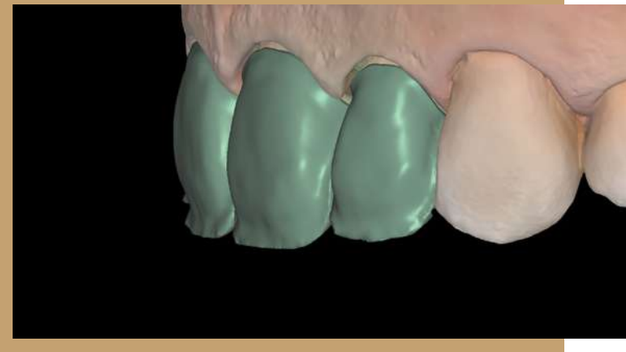
Figure 5
Occlusal view of the preparations.

Figure 6
Aesthetic analysis – a crucial step for achieving the desired new smile.

Figure 7
Frontal view of the crowns in their final cutback design.

Figure 8
Lateral view of the crowns in the CAD software.





Crown production

Immediately after milling, the zirconia surface was treated with effect liquids. This kind of pre-sintered characterization helps enhance the characteristics of zirconia restorations. In the presented case, orange stain was applied to the cervical area, while a blue stain was used at the incisal edge. In addition, a white opaque liquid was applied to the inner surface of the central zirconia crowns to block out any discolouration from the underlying tooth structure. Following final sintering, the vestibular layer of porcelain was built up with CERABIEN™ MiLai using a combination of internal stains and porcelain micro-layering. After morphological adjustments and surface polishing, the restorations were completed by applying CERABIEN™ ZR FC Paste Stain and Glaze. Final polishing was then performed to enhance the natural appearance of the surfaces.

Figure 9
Effect liquids applied to the cervical and incisal areas of the crowns.

Figure 10
Treatment of the central incisor crowns' inner surfaces.

Figure 11
KATANA™ Zirconia YML framework after sintering.

Figure 12
CERABIEN™ MiLai Internal Stains and Porcelains.

Figure 13
Prepared vestibular surfaces ready for application of the internal stains.

Figure 14
Application of 0.2-0.3 mm layers of CERABIEN™ MiLai porcelain: CCV2 for the cervical area, LT1 – Creamy Enamel for the main body and luster, LTX at the incisal edge.

Figure 15
Frontal view of the final restorations on the model.

Figure 16
Lateral view of the final restorations on the model.

Figure 17
Polished and glazed palatal surfaces of the crowns.

FINAL OUTCOME

The finalized restorations showcase great details, crafted with CERABIEN™ MiLai internal stains and porcelains. The result are natural-looking restorations. An additional benefit of using zirconia as a restorative material is its excellent compatibility, which is evident in the healthy gingival conditions.

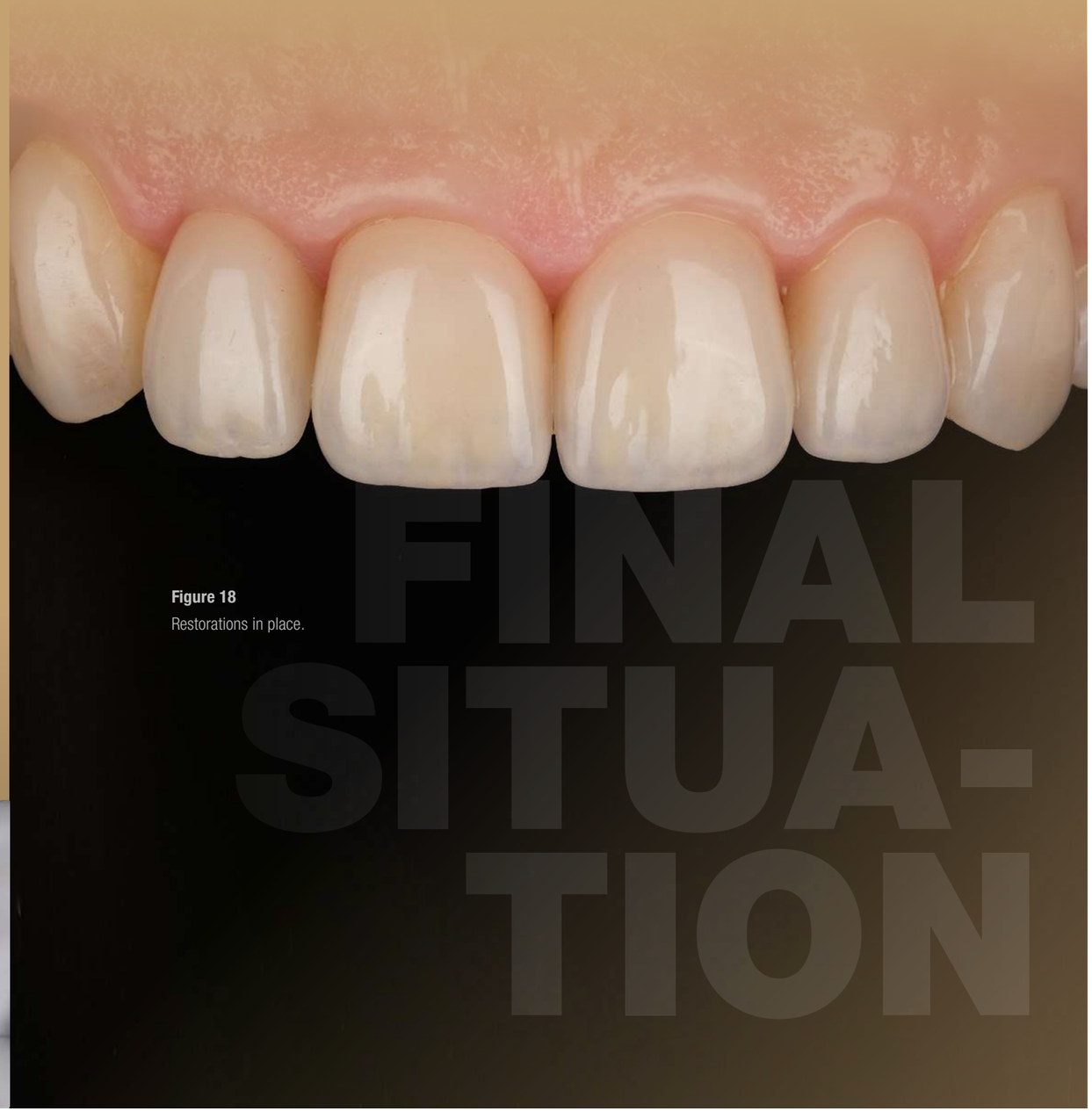


Figure 18
Restorations in place.

MICRO-LAYERING ON LITHIUM DISILICATE WITH CERABIEN™ MiLai

CASE BY MDT FRANCESCO FERRETTI

Is it possible to produce lifelike porcelain veneers using lithium disilicate and a porcelain system with a reduced number of internal stains and porcelains designed for micro-layering? This is what we wanted to find out when we decided to test the new CERABIEN™ MiLai line-up. As loyal users of the CERABIEN™ ZR family for porcelain layering on zirconia, we hoped that the new product would offer similar handling and optical properties.

The CERABIEN™ MiLai line-up consists of 15 internal stains and 16 porcelains, which are – like CERABIEN™ ZR – based on synthetic feldspathic porcelain technology from Kuraray Noritake Dental Inc. With a comparatively low firing temperature of 740 °C (or 1,364 °F), the system may be used on zirconia as well as silicate ceramic restorations, provided that the CTE value of the materials is between 10.2 and 10.5 × 10^{-6}/K (50 °C – 500 °C). This is true for lithium disilicate, our preferred base material for the production of ceramic veneers. The thickness of the porcelain layer is usually smaller than 0.5 mm, which allows us to exploit the aesthetic potential of the underlaying ceramic, while creating some individual effects for the underlying structure and the enamel. A clinical case predestined for the use of the new system is presented here.

CASE #10

Figure 1 (left page)
Young male patient with discoloured composite restorations on his maxillary central incisors.

Figure 2
The patient was unhappy with his smile aesthetics, so that it was decided to place more durable ceramic veneers.

Figure 3
Appearance of the central incisors after minimally invasive tooth preparation.

Figure 4
Veneers made of lithium disilicate individualized with CERABIEN™ MiLai placed on the model.

Figure 5
Intraoral view of the teeth after adhesive cementation of the veneers.

Figure 6
Close-up view of the anterior teeth.

Figure 7
Smooth optical integration of the veneers: They show some individual effects and are virtually indistinguishable from natural tooth structure of the adjacent lateral incisors.

Figure 8
Black-and-white photograph of the maxillary anterior teeth.

Figure 9
Smile aesthetics.

Figure 10
Beautiful treatment outcome.

FINAL SITUATION

COMPACT SYSTEM

The compact line-up of CERABIEN™ MiLai with its nicely developed internal stains and porcelains enables us to imitate the patient's natural teeth very well in the great majority of cases. Shades are easily selected and the favourable consistency of the porcelains facilitates application in thin layers. Due to the reduced thickness of the porcelain layer, it is possible to play with the optical properties of the underlying lithium disilicate, creating a final restoration with a natural appearance despite the simplified procedure.